ENGINEERING
INTERNATIONAL GROUP s.r.l.

MORPHEUS E

Anaesthesia Unit

code: OM3.SE

rev. 3: - dated 09/01/2013

INTENDED USE

The MORPHEUS E is an anaesthesia unit and it can be used on adult, children and newborn patients.

The MORPHEUS E is suitable for administration of Oxygen - Air - Nitrous Oxide - Halothane - Enflurane - Isoflurane - Sevoflurane - Desflurane mixtures.

GENERAL DESCRIPTION

The MORPHEUS E anaesthesia unit is completed with:

- electronic gas mixing system,
- electronic lung ventilator with 12” TFT colour display,
- valves group: open, semi-closed, closed, heated, with soda lime absorber of 1 Kg. capacity,
- SIARETEX rapid connection device, Selectatec compatible for 2 vaporizers
- gas supply group,
- gas analysis (optional function).

TECHNICAL DATA

Structure	Light aluminium alloy and plastic moulds
Wheels	Pivoting antistatic wheels, diameter 100 mm (2 with brakes)
Drawer	No. 3 full extension drawers
Cylinder support	No. 2 vertical cylinders supports, on the back side (for cylinders up to 10 litres capacity) and round rubber pads
Support for 2 vaporizers	On horizontal guide (SIARETEX rapid connection device, Selectatec compatible for 2 vaporizers)
Auxiliary power supply outlets	No. 1 SCHUKO 220 Vac outlet (max. 6 A)
Work shelf lighting	12Vdc by led
Dimensions	71 x 77 x 138 (L x P x H) cm (without monitor)
Weight	72 kg (without accessories)
Environmental conditions	• Temperature from 10 to 40°C • Relative humidity from 10 to 90% non-condensing

ELECTRONIC GAS MIXING SYSTEM

It has the function to regulate the capacity and the concentration of gas mixture (Air, O_2, N_2O) by displaying them on the TFT colour monitor and deliver it to the anaesthetic gas vaporizer.

It allows to select the mixture to be delivered (Air - O_2, or N_2O - O_2) and the O_2 enrichment for delivered mixture in case of emergency. The anaesthesia module includes a device which guarantees a minimum concentration of 25% oxygen in all gas erogating conditions (MIX-LIFE device).

Through the three pressure gauges on the front panel it allows the continuous control of medical gas feeding pressure coming from the gas pipelines system.

The electronically controlled flowmeter box is equipped with a safety traditional calibrated flowmeter indicating the total delivered flow.

The electronic flowmeter box provides the option on demand to use an alternative anaesthetic gas inspite of N_2O: the Xenon (Xe).

Auto test	At electronic flowmeter start-up a control test is automatically performed
Oxygen rotameter	Scale 0.1 - 15 L/min. Resolution: 0.1 L/min. Accuracy: ± 7% of read value
Nitrous oxide rotameter	Scale 0.1 - 9 L/min. Resolution: 0.1 L/min. Accuracy: ± 7% of read value
Air rotameter	Scale 0.1 - 15 L/min. Resolution: 0.1 L/min. Accuracy: ± 7% of read value
Medical gas supply	OXYGEN • Pressure included between 280 kPa and 600 kPa (2,8 – 6 bar) • Max. required flow 90 L/min.
	NITROUS OXIDE • Pressure included between 280 kPa and 600 kPa (2,8 – 6 bar) • Max. required flow 15 L/min.
	MEDICAL COMPRESSED AIR • Pressure included between 280 kPa and 600 kPa (2,8 – 6 bar) • Max. required flow 90 L/min.
Gauges	No. 3 on front panel (O_2 - N_2O - AIR), scale 0 - 6 bar
Electric power supply	100 ÷ 240Vac / 45 ÷ 60Hz
Back-up battery	12Vdc - 3,0 Ah Pb battery; it grants 120 minutes operation
Alarms	• Lack or low O_2 pressure with consequent cut-off of N_2O delivery • Lack or low N_2O pressure • Lack or low Xe pressure • Lack or low AIR pressure • Fresh gas occlusion

Safety devices	AGAINST THE ADMINISTRATION OF HYPOXIC MIXTURES MIX-LIFE. It always guarantees a minimum concentration of 25 % oxygen on mixtures which includes nitrous oxide. IN CASE OF LACK OR LOW OXYGEN PRESSURE CUT-OFF. Visible and audible alarm with immediate cut-off of nitrous oxide delivery. AGAINST OVERPRESSURE IN FLOWMETER BOX Pressure sensor for the protection of flowmeter box components IN CASE OF LACK OR COMPRESSED AIR LOW PRESSURE All the devices (gas feeding) supplied by compressed air are automatically supplied by oxygen. AGAINST THE SIMULTANEOUS DELIVERY OF AIR AND N_2O Selection by membrane key on the flowmeter front panel.
Control for activation of exit of fresh gas for manual ventilations.	Setting of MANUAL modality on ventilator (MAN) with automatic deviation of fresh gas to the manual system of anaesthesia unit valves group, or to a TO-AND-FRO circuit with visual indicator. Automatic deactivation of manual ventilation systems directly by ventilator control.
O_2 emergency by-pass	By apposite membrane key on the front shelf, max flow 35 L/min.
IN gas sockets on gas supply group	• No. 3 sockets for distribution system (O_2 - N_2O - AIR) • No. 2 sockets for cylinder (O_2 - N_2O)
OUT gas sockets on gas supply group	• No. 1 sockets for O_2 • No. 1 sockets O_2 - AIR for active scavenger feeding • No. 1 fresh gas connector for external use for ex. TO AND FRO (selectable by apposite membrane key on the front shelf - AUX).
Other	• Socket for recycle of exhaust monitor gas • Connection for anaesthetic gas scavenging (optional device: active type, or passive type)

BREATHING SYSTEM

Compact system with automatic connections, easy dismountable and autoclavable

It allows the ventilation in modality: real open circuit, semi-closed circuit, closed circuit at low flows.

The system also allows the spontaneous and manual ventilation in case of anaesthesia unit breakdown or machine off.

Top special CO_2 absorber canister of 1 Kg with rapid connection: this allows canister replacement also during interventions (the canister is autoclavable and reusable).

The recycling system is a selective type, hence the soda lime and fresh gas consumption are reduced to the minimum.

The heated valves group reduces the condensation and heats the fresh gas.

The transition from one ventilation modality to another is completely controlled by the ventilator without any user's action on valves group.

LUNG VENTILATOR

User's interface	12" TFT high resolution colour display with membrane keyboard and encoder
Control modality	Electronic by microprocessor
Dead space compensation system	Automatic
Flow generation	Electronic system
Gas feeding	Medical compressed air or Oxygen with pressure included between 280 kPa and 600 kPa (2,8 – 6 bar) **Option:** turbine for gas feeding independent from gas pipelines system.

Autotest	**Primary test:** at anaesthesia unit's start-up, a control test of medical gas supply circuit losses, INSP and EXP flow sensors operation, pressure sensor, patient circuit losses, back-up battery state, oxygen cell, integrity of audible alarm is automatically performed. This test takes around 15 seconds. **Subtest**: the unit for anaesthesia has a subtest which is activated by the user in the ventilator menu. This subtest permits to verify the dead space and losses or to perform the oxygen cell calibration.
Ventilation modalities	APCV-PCV; APCV-TV; PSV; APNOEA BACK-UP; VC/VAC; SIMV+PS (volumetric); SPONT; MANUAL. Integrated NEONATAL ventilation mode VC/VAC BABY
Ventilation modalities **(optional)**	CPAP, SIMV+PS (by pressure), BILEVEL S/ST.
Breathing rate	From 5 to 120 bpm (step 1 bpm)
I:E Ratio	1:1, 1:1.5, 1:2, 1:3, 2:1, 3:1
Inspiratory time	From 0,2 to 5 sec.
Inspiratory pause	From 0 to 60% of inspiratory time
SIMV rate	From NO, 1 ÷ 119 bpm
Tidal volume	From 5 to 1500 ml (< 50ml: step 1ml / 50-100ml: step 5ml / >100ml step 10ml)
Minute volume	From 1 to 30 liters
PEEP	OFF, 3 ÷ 30 cmH_2O (step 1 cmH_2O)
Inspiratory flow	From 1 to 80 L/min
Oximeter	Minimum resolution 1% Automatic calibration procedure
Bronchomanometer	-20 ÷ 80 cmH_2O
Flow trigger	From OFF, 1 ÷ 15 L/min (step 1 L/min)
Pressure trigger	From -1 to -9 cmH_2O under the PEEP level
Safety	Electronic and mechanical limit of airways pressure Self-diagnosis system

Alarms	• Low / High airways Pressure, Low / High Breathing Rate, Low / High O_2 Concentration, Low / High Tidal Volume, Electric Power Supply • Apnoea, Low Battery, Low Gas Supply, Disconnected Patient Circuit, Can-Bus Failure
Flow sensor	Internal to the valves group, by magnetic perturbance, reusable.
Measured parameters	• PAW; PEEP; Rate; I:E; FiO_2; Vte; ExpMV • MAP; Pplateau; Tpause; Ti; Te; Fi; Fe; Cs; Ri;
Ventilation Curves	CURVES: Pressure - Flow - Volume LOOPs: Volume / Pressure and Flow / Volume Measurement RANGE: automatic
Trend	Scale and 72 hours trend period setting Foreseen Trends: PAW; PEEP; VTe; ExpMV; Rate
Events	Memory storage up to 100 events per machine including the alarms.

GAS ANALYSIS - (Optional Function)

Gas analysis	Integrated software for analysis of CO_2, O_2, N_2O, AG automatic identification, MAC.
Mainstream device	• IRMA AX+ (CO_2, N_2O, primary and secondary agents, HAL, ISO, ENF, SEV, DES). • IRMA CO_2 (CO_2)
Sidestream device	• ISA AX+ (CO_2, N_2O, Agents) • ISA CO_2 (CO_2) • ISA OR+ (CO_2, N_2O, Agents, O_2)
Technical characteristics	Consult the relevant technical data sheets for mainstream and sidestream modules.

ELECTRIC POWER SUPPLY

Electric power supply	100 ÷ 240Vac / 45 ÷ 60Hz
Maximum power	120 Watt
Back-up battery	12Vdc - 3 Ah pb battery which guarantees an autonomy of around 120 minutes
Charging time	Around 10 hours

CONFORMITY TO DIRECTIVES

Class and type according with IEC 601-1	Class I Type B
Class according with 93/42/EEC Dir.ve.	Class IIb

IEC 601-1, IEC 601-1-1, IEC 601-1-2, IEC 601-1-4, EN 1281-1, UNI EN 740, UNI EN ISO 9703-3, EN 4135, 93/42/EEC Dir.ve.

ACCESSORIES

Standard accessories	• User's Manual • O_2 supply hose • N_2O supply hose • Air supply hose • O_2 cylinder supply hose • N_2O cylinder supply hose • Top Special CO_2 absorber canister of 1 kg. • O_2 cell • Adult silicone patient circuit • Adult Mapleson C adult patient circuit • Manual ventilation KIT • SHUKO-VDE electric power supply cable
Other optional accessories	See current export price list

SIARE applies the UNI EN ISO 13485:2004 Quality System and 93/42 EEC Dir.ve.

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